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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/603,828	06/26/2003	Jong-Cheol Shin	SEC.1053	6468
20987	7590	11/29/2004	EXAMINER	
VOLENTINE FRANCO, & WHITT PLLC			VO, ANH T N	
ONE FREEDOM SQUARE			ART UNIT	
11951 FREEDOM DRIVE SUITE 1260			PAPER NUMBER	
RESTON, VA 20190			2861	

DATE MAILED: 11/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/603,828

Applicant(s)

SHIN ET AL.

Examiner

Anh t.n Vo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4-8 is/are allowed.
- 6) ☒ Claim(s) 1-3, 9, 10 and 15 is/are rejected.
- 7) ☒ Claim(s) 11-14 and 16-19 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any

CLAIM REJECTIONS

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 9-10, and 15 are rejected under 35 USC 102 (b) as being anticipated by IBM Technical Disclosure Bulletin (NN76112255).

Note: The method steps are inherently taught in the apparatus device/limitations in the rejections as follow:

IBM disclose in Figures 1-2 an printing system comprising:

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- a semiconductor wafer (4) having an opening (6) extending therethrough, said opening defining a nozzle for ejecting ink;
- an ink cartridge (12) disposed on one side of the semiconductor wafer (4), the inside of said ink cartridge (4) communicating with said opening (6) in said semiconductor wafer (4) so that ink is supplied from said ink cartridge (12) to the nozzle (6) of said semiconductor wafer (4);
- an ink ejection unit (18) interposed between said ink cartridge (12) and said semiconductor wafer (4) and operable to force ink from said nozzle (6); - wherein said ink ejection unit (18) includes a piezoelectric element; and
- wherein the forming of the nozzle (6) comprises isotropically and anisotropically etching the semiconductor wafer via said opening in the ink ejection unit (18).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior arts are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 USC 103 (a) as being unpatentable over IBM Technical Disclosure Bulletin (NN76112255) in view of Kawamura et al. (US Pat. 6,641,744).

IBM discloses the basic features of the claimed invention were stated above but does not disclose the ink ejection unit (40) including a resistor.

Kawamura et al. discloses in Figure 12 an ink jet print head comprising the ink ejection unit (40) including a resistor.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teaching of Kawamura et al. into the IBM silicon nozzles for the purpose of emitting a droplet from the nozzle.

Citation of Pertinent Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art references (US Pat. 5,719,605; US Pat. 6,162,589; US Pat. 6,241,905; US Pat. 6,261,742; US Pat. 6,502,921; US Pat. 6,663,231;) cited in the PTO 892 form show an ink jet printinghead which is deemed to be relevant to the present invention. These references should be reviewed.

Allowable Subject Matter

Claims 4-8 are allowable. These claims would be allowable because none of the prior art references of record discloses an ink jet printer head comprising an opening of a semiconductor wafer defining a nozzle for ejecting ink and including a hemispherical cavity that forms a hemispherical portion of the nozzle; a supporting layer interposed between said ink cartridge and said semiconductor wafer, the supporting layer having an opening located over the hemispherical portion of said nozzle in the combination as claimed.

Claims 11-14 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims. These claims would be allowable because none of the prior art references of record discloses a method of fabricating an inkjet printer head comprising steps of forming a protective layer over the semiconductor wafer on which the resistor has been formed, and sequentially patterning the protective layer and the supporting layer to form said opening of the ejection unit in the combination as claimed.

Claims 16-19 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims. These claims would be allowable because none of the prior art references of record discloses a method of fabricating an inkjet printer head comprising steps isotropically etching a portion of the semiconductor wafer exposed through the opening in the ink ejection unit so as to form a hemispherical cavity constituting a hemispherical upper portion

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of the nozzle under the ink ejection unit, and subsequently anisotropically etching the semiconductor wafer through the opening in the ink ejection unit so as to form a lower portion of the nozzle extending from the bottom of said hemispherical cavity in the combination as claimed.

CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Anh Vo. whose telephone number is (571) 272-2262.

The fax number of this Group 2800 is (703) 872-9306.



ANH T.N. VO
PRIMARY EXAMINER

November 23, 2004